

**ANNEX
BETWEEN
THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
AMES RESEARCH CENTER
AND
OHIO DEPARTMENT OF TRANSPORTATION
UNDER SPACE ACT UMBRELLA AGREEMENT
NO. 34682, DATED 5/7/2021
(ANNEX NUMBER 2)**

ARTICLE 1. PURPOSE

This Annex shall be for the purpose enabling a collaborative activity between NASA System-Wide Safety (SWS) researchers and the Ohio Department of Transportation (“ODOT” or “Partner”). With the execution of this Annex, both Parties will be able to share critical safety flight and ground operations data, evaluate safety arguments and safety management systems for highly-automated emerging aviation operations, and evaluate the risks of emerging Advanced Air Mobility operations. NASA SWS will provide information and open-source tools for safety case analysis and assessment, safety management systems, and risk analysis and prognostics. ODOT, an entity of the State of Ohio, will provide access flight and ground operations data obtained from their operations in the National Airspace System (NAS), including but not limited to operations from the SkyVision program.

In accordance with NASA ARC Intelligent System’s IT Security Plan (CD-9999-M-ARC-3249), NASA will be using its open-sourced algorithms to understand the data. This collaborative effort will also include frequent interaction between subject matter experts at NASA and ODOT to adjust best practices as necessary to develop an effective and robust demonstration of highly-automated aerospace vehicle safety management systems.

The legal authority for this Annex, consistent with the Umbrella Agreement, is in accordance with the Space Act, Other Transactions Authority (OTA), 51 U.S.C. § 20113(e).

ARTICLE 2. RESPONSIBILITIES

A. NASA ARC will use reasonable efforts to:

Year One:

1. Identify risks and hazards that can be mitigated using NASA's safety services, functions, and capabilities (SFCs) as defined in NASA In-Time Aviation Safety Management System (IASMS) ConOps.
2. Review ODOT's concepts of operation and planned operational procedures as delivered and provide recommendations for safety monitoring, assessment, and mitigations as described in the NASA Aeronautics Research Mission Directorate (ARMD) Strategic Implementation Plan (SIP) Thrust 5.

Years Two & Three:

1. Analyze flight and operational data as provided and assess the data for consistency and completeness, and for safety risks and hazards.
2. Provide subject-matter expertise and access to NASA-released safety SFCs.

B. Partner will use reasonable efforts to:

Year One:

1. Provide concepts of operation, when possible, and planned operational procedures for each intended operation under the planned flights and testing as managed by the Ohio Department of Transportation and their collaborators.
2. ODOT and ODOT's partners will review NASA's safety recommendations and ODOT and their partners will make decisions about future implementation.

Years Two & Three:

1. Provide flight and operational data from relevant flights--including non-cooperative flight data and NAS Enterprise Service Gateway (NESG) data, if possible--and testing as monitored and generated by ODOT and ODOT's collaborators.
2. Evaluate the integration of potential additional NASA-provided safety SFCs.

C. NASA ARC and Partner will use reasonable efforts to:

Year Two:

1. Jointly evaluate operational procedures to identify safety monitoring, assessment, and mitigation improvements and gaps.

Year Three:

1. Jointly evaluate any evidence generated and discuss findings towards a safety case for novel operations. This evidence and these findings can then be used as a basis for each entity's separate recommendations to regulators and to industry standards committees.

ARTICLE 3. SCHEDULE AND MILESTONES

The planned major milestones for the activities for this Annex defined in the "Responsibilities" Article are as follows:

Milestone	Estimated Completion Date
Identify risks and hazards that can be mitigated using NASA's safety services (NASA)	1 months from Effective Date to 12 months from Effective Date
Provide concepts of operation and planned operational procedures for the planned flights and testing (ODOT)	1 months from Effective Date to 12 months from Effective Date
Review ODOT's concepts of operation and planned operational procedures as delivered and provide recommendations for safety (NASA)	1 months from Effective Date to 12 months from Effective Date
Review NASA's safety recommendations and make decisions about future implementation (ODOT)	1 months from Effective Date to 12 months from Effective Date

Provide flight and operational data from relevant flights, including non-cooperative flight data and NAS Enterprise Service Gateway data (ODOT)	12 months from Effective Date to 34 months from Effective Date
Analyze flight and operational data as provided and assess the data for consistency and completeness, and for safety risks and hazards (NASA)	12 months from Effective Date to 34 months from Effective Date
Evaluate the integration of potential additional NASA-provided safety SFCs (ODOT)	12 months from Effective Date to 34 months from Effective Date
Provide subject-matter expertise and access to NASA-released safety SFCs (NASA)	12 months from Effective Date to 35 months from Effective Date
Evaluate operational procedures to identify safety monitoring, assessment, and mitigation improvements and gaps (Joint)	12 months from Effective Date to 36 months from Effective Date
Evaluate any evidence generated and discuss findings towards a safety case for novel operations (Joint)	24 months from Effective Date to 36 months from Effective Date

ARTICLE 4. FINANCIAL OBLIGATIONS

There will be no transfer of funds between the Parties under this Agreement and each Party will fund its own participation. All activities under or pursuant to this Agreement are subject to the availability of funds, and no provision of this Agreement shall be interpreted to require obligation or payment of funds in violation of the Anti-Deficiency Act, (31 U.S.C. § 1341).

ARTICLE 5. INTELLECTUAL PROPERTY RIGHTS - DATA RIGHTS

- A. Data produced under this Annex which is subject to paragraph C. of the Intellectual Property Rights - Data Rights Article of the Umbrella Agreement will be protected for the period of one year.
- B. Under paragraph H. of the Intellectual Property Rights - Data Rights Article of the Umbrella Agreement, Disclosing Party provides the following Data to Receiving Party. The lists below may not be comprehensive, are subject to change, and do not supersede any restrictive notice on the Data provided.
 1. Background Data: The Disclosing Party's Background Data, if any, will be identified in a separate technical document.
 2. Third Party Proprietary Data: The Disclosing Party's Third Party Proprietary Data, if any, will be identified in a separate technical document.
 3. Controlled Government Data: The Disclosing Party's Controlled Government Data, if any, will be identified in a separate technical document.

4. The following software and related Data will be provided to Partner under a separate Software Usage Agreement: None

ARTICLE 6. TERM OF ANNEX

This Annex becomes effective upon the date of the last signature below (“Effective Date”) and shall remain in effect until the completion of all obligations of both Parties hereto, or three years from the Effective Date, whichever comes first, unless such term exceeds the duration of the Umbrella Agreement. The term of this Annex shall not exceed the term of the Umbrella Agreement. The Annex automatically expires upon the expiration of the Umbrella Agreement.

ARTICLE 7. RIGHT TO TERMINATE

Either Party may unilaterally terminate this Annex by providing thirty (30) calendar days written notice to the other Party.

ARTICLE 8. POINTS OF CONTACT

The following personnel are designated as the Points of Contact between the Parties in the performance of this Annex.

Management Points of Contact

NASA Ames Research Center

Nahri Ahn
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Ohio Department of Transportation

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Technical Points of Contact

NASA Ames Research Center

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Ohio Department of Transportation

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Richard.Fox@dot.ohio.gov

ARTICLE 9. MODIFICATIONS

Any modification to this Annex shall be executed, in writing, and signed by an authorized representative of NASA and the Partner. Modification of an Annex does not modify the terms of

the Umbrella Agreement.

ARTICLE 10. SIGNATORY AUTHORITY

The signatories to this Annex covenant and warrant that they have authority to execute this Annex. By signing below, the undersigned agrees to the above terms and conditions.

**NATIONAL AERONAUTICS AND
SPACE ADMINISTRATION
AMES RESEARCH CENTER**

**OHIO DEPARTMENT OF
TRANSPORTATION**

BY: _____
Dr. Rupak Biswas
Director of Exploration Technology

BY:  _____
Jack Marchbanks
Director

DATE: _____

DATE: May 5, 2022